

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

Claims 1-14 (canceled)

Claim 15 (new): A method for encoding and transmitting an XML document, the method comprising:

a) normalizing an XML schema associated with the XML document, the normalization of the XML schema comprising one of:

simplifying a group which contains only one element, the group being dissolved and the one element being put into a content model at a level of the dissolved group, with attributes minOccurs and maxOccurs of the element being replaced by a product of corresponding attributes of the dissolved group and the one element prior to regrouping;

simplifying a choice group containing an element with an attribute value minOccurs = 0, the attribute minOccurs of the choice group being set to 0 irrespective of a previous value, with the element having the attribute value minOccurs = 0 being assigned an attribute value minOccurs = 1; and

simplifying nested choice groups, wherein if a choice group contains a further choice group containing attribute values minOccurs = maxOccurs = 1, the further choice group is dissolved and contents of the further choice group are incorporated directly into the choice group;

b) encoding the normalized XML schema using a metaschema;
c) transmitting the encoded XML schema in a first bit stream;
d) encoding the XML document using the associated XML schema; and
e) transmitting the encoded XML document in a second bit stream, wherein the first and second bit streams are provided for reception for a decoder.

Claim 16 (new): A method for encoding and transmitting an XML document as claimed in Claim 15, further comprising restructuring at least one of element declarations and attributes declarations of a schema definition of a

structured document such that anonymous type definitions are taken out of the respective at least one of element declarations and attribute declarations and are given at least one of a name and a code which is used for referencing purposes for the corresponding element.

Claim 17 (new): A method for encoding and transmitting an XML document as claimed in Claim 15, wherein, in place of at least one of type names, element names and names of substitution groups, only numbers and at least one table containing an allocation between numbers and the respective at least one of type names, element names and names of substitution groups are encoded.

Claim 18 (new): A method for encoding and transmitting an XML document as claimed in Claim 15, wherein at least one list comprising at least one of types names, element names, and names of substitution groups, as well as positions of the respective type names, element names and names of substitution groups in the list, are encoded in place of the respective type names, element names and names of substitution groups.

Claim 19 (new): A method for encoding and transmitting an XML document as claimed in Claim 15, wherein information for at least one of an inheritance tree of types, global elements and substitution groups is encoded, and wherein at least one of (i) each type is described by both an item of information about a respective type code with reference to a master type and a length of all type codes which refer to the type described, (ii) each global element is described by both a length of a respective SBC and the respective SBC, and (iii) each element in a substitution group is described by both a length of a respective substitution code and the respective substitution code.

Claim 20 (new): A method for encoding, transmitting and decoding an XML document, the method comprising:

a) normalizing an XML schema associated with the XML document, the normalization of the XML schema comprising one of:

simplifying a group which contains only one element, the group being dissolved and the one element being put into a content model at a level of the dissolved group, with attributes minOccurs and maxOccurs of the element being replaced by a product of corresponding attributes of the dissolved group and the one element prior to regrouping;

simplifying a choice group containing an element with an attribute value minOccurs = 0, the attribute minOccurs of the choice group being set to 0 irrespective of a previous value, with the element having the attribute value minOccurs = 0 being assigned an attribute value minOccurs = 1; and

simplifying nested choice groups, wherein if a choice group contains a further choice group containing attribute values minOccurs = maxOccurs = 1, the further choice group is dissolved and contents of the further choice group are incorporated directly into the choice group;

b) encoding the normalized XML schema using a metaschema;

c) transmitting the encoded XML schema in a first bit stream;

d) encoding the XML document using the associated XML schema;

e) transmitting the encoded XML document in a second bit stream, wherein the first and second bit streams are provided for reception for a decoder;

f) decoding the encoded XML schema transmitted in the first bit stream into the normalized XML schema by using the metaschema, wherein the normalized schema and the metaschema correspond to the schemas used in the encoding; and

g) decoding the encoded XML document transmitted in the second bit stream by using the normalized XML schema, without performing a further normalization of the normalized XML schema.

Claim 21 (new): A method for encoding, transmitting and decoding an XML document as claimed in Claim 20, further comprising restructuring at least one of element declarations and attribute declarations of a structured document

such that anonymous types, to each of which at least one of a name and a code has been assigned for purposes of transmission, are inserted in the respective at least one of element declarations and attribute declarations by which the respective anonymous type is referenced.

Claim 22 (new): A method for encoding, transmitting and decoding an XML document as claimed in Claim 20, wherein at least one of type names, element names and names of substitution groups are decoded via numbers and at least one table containing an allocation between numbers and the respective at least one of type names, element names and names of substitution groups.

Claim 23 (new): A method for encoding, transmitting and decoding an XML document as claimed in Claim 20, wherein at least one of type names, element names and names of substitution groups are decoded via at least one list comprising the respective at least one of type names, element names and names of substitution groups and positions of the respective at least one of type names, element names and names of substitution groups in the list.

Claim 24 (new): A method for encoding, transmitting and decoding an XML document as claimed in Claim 20, wherein information for at least one of an inheritance tree of types, global elements and substitution groups is first decoded, and wherein at least one of (i) each type is described by both an item of information about a respective type code with reference to a master type and a length of all type codes which refer to the type described, (ii) each global element is described by both a length of a respective SBC and the respective SBC, and (iii) each element in a substitution group is described by both a length of a respective substitution code and the respective substitution code.

Claim 25 (new): A device for encoding XML documents, comprising an encoder unit for effecting a method which includes the steps of:

a) normalizing an XML schema associated with the XML document, the normalization of the XML schema comprising one of:

simplifying a group which contains only one element, the group being dissolved and the one element being put into a content model at a level of the dissolved group, with attributes minOccurs and maxOccurs of the element being replaced by a product of corresponding attributes of the dissolved group and the one element prior to regrouping;

simplifying a choice group containing an element with an attribute value minOccurs = 0, the attribute minOccurs of the choice group being set to 0 irrespective of a previous value, with the element having the attribute value minOccurs = 0 being assigned an attribute value minOccurs = 1; and

simplifying nested choice groups, wherein if a choice group contains a further choice group containing attribute values minOccurs = maxOccurs = 1, the further choice group is dissolved and contents of the further choice group are incorporated directly into the choice group;

b) encoding the normalized XML schema using a metaschema, wherein the encoded XML schema is to be transmitted in a first bit stream; and

c) encoding the XML document using the associated XML schema wherein the encoded XML document is to be transmitted in a second bit stream, with the first and second bit streams being provided for reception for a decoder.

Claim 26 (new): A device for encoding XML documents as claimed in Claim 25, wherein the encoder unit displays a configurable byte code interpreter which interprets information in a byte code and which, depending on a configuration, produces a code from the structured document based on a byte code which represents one of a path and a payload.

Claim 27 (new): A system for encoding and decoding XML documents comprising:

an encoder unit which comprises:

a) normalizing an XML schema associated with the XML document, the normalization of the XML schema comprising one of:

simplifying a group which contains only one element, the group being dissolved and the one element being put into a content model at a level of the dissolved group, with attributes minOccurs and maxOccurs of the element being replaced by a product of corresponding attributes of the dissolved group and the one element prior to regrouping;

simplifying a choice group containing an element with an attribute value minOccurs = 0, the attributes minOccurs of the choices group being set to 0 irrespective of a previous value, with the element having the attribute value minOccurs = 0 being assigned an attribute value minOccurs = 1; and

simplifying nested choice groups, wherein if a choice group contains a further choice group containing attribute values minOccurs = maxOccurs = 1, the further choice group is dissolved and contents of the further choice group are incorporated directly into the choice group;

b) encoding the normalized XML schema using a metaschema, wherein the encoded XML schema is to be transmitted in a first bit stream; and

c) encoding the XML document using the associated XML schema wherein the encoded XML document is to be transmitted in a second bit stream, with the first and second bit streams being provided for reception for a decoder;

and a decoder unit for effecting a method which comprises:

d) decoding the encoded XML schema transmitted in the first bit stream into the normalized XML schema by using the metaschema, wherein the normalized schema and the metaschema correspond to the schemas used in the encoding; and

e) decoding the encoded XML document transmitted in the second bit stream by using the normalized XML schema, without performing a further normalization of the normalized XML schema.

Claim 28 (new): A system for encoding and decoding XML documents as claimed in Claim 27, wherein the decoder unit displays a configurable byte code

interpreter which is configurable via information from the byte stream and which, depending on a configuration, produces at least one of a path, a payload and a byte code from the byte stream based on a byte code.